1. Multiply the following functions, then choose the domain of the resulting function from the list below.

$$f(x) = 6x^2 + x + 6 \text{ and } g(x) = \sqrt{4x + 25}$$

A. The domain is all Real numbers except $x = a$, where $a \in [2.4, 11.4]$

B. The domain is all Real numbers greater than or equal to $x = a$, where $a \in [-9.25, -4.25]$

C. The domain is all Real numbers less than or equal to $x = a$, where $a \in [-2.5, 10.5]$

D. The domain is all Real numbers except $x = a$ and $x = b$, where $a \in [5.67, 11.67]$ and $b \in [-7.83, -0.83]$

E. The domain is all Real numbers.

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2. Choose the interval below that f composed with g at $x = 1$ is in.

$$f(x) = 3x^3 + 2x^2 - x - 4 \text{ and } g(x) = 2x^3 - 4x^2 + 2x + 2$$

A. $(f \circ g)(1) \in [34, 39]$

B. $(f \circ g)(1) \in [2, 4]$

C. $(f \circ g)(1) \in [8, 18]$

D. $(f \circ g)(1) \in [21, 31]$

E. It is not possible to compose the two functions.

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3. Choose the interval below that f composed with g at $x = 1$ is in.

$$f(x) = 2x^3 + 3x^2 - 2x \text{ and } g(x) = -3x^3 - 3x^2 + 4x$$

A. $(f \circ g)(1) \in [1, 11]$

B. $(f \circ g)(1) \in [-109, -103]$

C. $(f \circ g)(1) \in [-1, 1]$

D. $(f \circ g)(1) \in [-102, -90]$

E. It is not possible to compose the two functions.

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4. Find the inverse of the function below. Then, evaluate the inverse at $x = 6$ and choose the interval that $f^-1(6)$ belongs to.

$$f(x) = \ln(x+4) + 4$$

A. $f^{-1}(6) \in [1.39, 5.39]$

B. $f^{-1}(6) \in [22019.47, 22024.47]$

C. $f^{-1}(6) \in [9.39, 14.39]$

D. $f^{-1}(6) \in [22029.47, 22035.47]$

E. $f^{-1}(6) \in [9.39, 14.39]$

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5. Find the inverse of the function below (if it exists). Then, evaluate the inverse at $x = 15$ and choose the interval that $f^-1(15)$ belongs to.

$$f(x) = 2x^2 - 3$$

A. $f^{-1}(15) \in [5.93, 6.5]$

B. $f^{-1}(15) \in [2.58, 3.53]$

C. $f^{-1}(15) \in [4.86, 5.77]$

D. $f^{-1}(15) \in [2.06, 2.97]$

E. The function is not invertible for all Real numbers.

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6. Find the inverse of the function below. Then, evaluate the inverse at $x = 8$ and choose the interval that $f^-1(8)$ belongs to.

$$f(x) = e^{x-5} - 2$$

A. $f^{-1}(8) \in [-0.01, 1.1]$

B. $f^{-1}(8) \in [-3.28, -2.68]$

C. $f^{-1}(8) \in [-2.24, -0.83]$

D. $f^{-1}(8) \in [7.11, 8.12]$

E. $f^{-1}(8) \in [-0.33, 0.41]$

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7. Determine whether the function below is 1-1.

$$f(x) = 36x^2 - 204x + 289$$

A. No, because there is an x-value that goes to 2 different y-values.

B. Yes, the function is 1-1.

C. No, because there is a y-value that goes to 2 different x-values.

D. No, because the range of the function is not $(-\infty, \infty)$.

E. No, because the domain of the function is not $(-\infty, \infty)$.

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8. Determine whether the function below is 1-1.

$$f(x) = 9x^2 - 21x - 228$$

A. No, because the domain of the function is not $(-\infty, \infty)$.

B. No, because there is a y-value that goes to 2 different x-values.

C. No, because the range of the function is not $(-\infty, \infty)$.

D. Yes, the function is 1-1.

E. No, because there is an x-value that goes to 2 different y-values.

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9. Add the following functions, then choose the domain of the resulting function from the list below.

$$f(x) = \sqrt{-6x + 22} \text{ and } g(x) = 8x + 3$$

A. The domain is all Real numbers except $x = a$, where $a \in [-4.4, 2.6]$

B. The domain is all Real numbers greater than or equal to $x = a$, where $a \in [4.25, 6.25]$

C. The domain is all Real numbers less than or equal to $x = a$, where $a \in [1.67, 4.67]$

D. The domain is all Real numbers except $x = a$ and $x = b$, where $a \in [-5.83, -0.83]$ and $b \in [4.83, 12.83]$

E. The domain is all Real numbers.

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10. Find the inverse of the function below (if it exists). Then, evaluate the inverse at $x = 15$ and choose the interval that $f^-1(15)$ belongs to.

$$f(x) = \sqrt[3]{5x - 2}$$

A. $f^{-1}(15) \in [-675.69, -675.24]$

B. $f^{-1}(15) \in [675.16, 675.65]$

C. $f^{-1}(15) \in [673.87, 674.67]$

D. $f^{-1}(15) \in [-675.01, -674.59]$

E. The function is not invertible for all Real numbers.
